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COLOR FIELD WORK*

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For various reasons this will be a rather short paper as regards Perimetry. For, if you have been reading your magazines faithfully for the past year (and it is preseumed that you have), you will recall that there has been a great deal of discussion of this subject, so much so, in fact, that there is not much left to say at this time without having too much in quotation marks which I am very much adverse to doing except where absolutely necessary. So, as we go along I will endeavor to inject a few thoughts along other lines yet without losing sight of the topic at hand. In this day of advanced thought and scientific achievements we are being continually deluged with new theories and hobbies that we are scarcely mired in one until we are overwhelmed with another.

Some of our most enthusiastic optometrists are the most inconsistent and if brought to task will excuse themselves by saying what was true yesterday is false today.

In that statement I see only further inconsistency for, once a fact, always a fact, and truth can never become a lie. However, with all the new theories and panaceas offered us I believe it unwise to ignore them for, no doubt, some good can be had from at least some of them which makes it worthwhile to investigate when if we find an idea or instrument has 50 per cent merit, it is well to look into it for there is always a chance to develop a much higher percentage of worth and value. But as these new theories and hobbies are being continually thrust upon us with such enthusiasm and in such glowing terms that we are prone, as a comparatively new profession, to be too eager by expecting a real panacea while we should not expect more than a few crumbs from the enchanting loaf if we would not have our fond hopes shattered. We simply have expected too much from some man's "brain child." Granting all things have merit we must not expect 100 per cent perfection.

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Let us not lose sight of the fact that in combining human effort with instrumentation the chances of error are doubled.

The instrument may be as accurate as is possible for man to make yet where the human element at both ends of the instrument must be reckoned with there is a mighty opportunity for discouragement. The results do not, we feel, justify mathematics.

I believe that the ophtholmometer is mathematically correct in itself, yet I have seen the break change as much as a diopter by the blinking of the eye or by a drop of moisture suddenly appearing on the cornea. So, with perimetry color field work, it is not over reliable. Were it perfectly dependable it would be quite fascinating and of much value in diagnosis of human ills and is invaluable as an aid to diagnosis.

Perimetry is not new nor is it so very old and is a subject understood by comparatively few men and many of those men are more or less doubtful. I will not go into the history of the subject as that was fairly well covered in my previous paper.[1] The work, however, is interesting if at times it is disappointing; disappointing because like every other technic which involves the equation of instrumentation and human element, which in all cases must be reckoned with, for in the final summing up there must be space for that little word "IF" which is our alibi when we fail of results. The psychological phase necessarily entering into this takes it out of the realm of mathematics, the exact science, and leaving that element of doubt and uncertainty. But if we should weaken because of these conditions our profession would never develop beyond the mere trade of merchandising "Specs."

So, we might take the ductions and phorias every day and get no two identical findings but there is a cause for the discrepancy just as it is for variations in the color charts and for the same identical reasons. For instance, we find ductions low at one time and at the same time we find color lines constricted which usually reveals the cause of the low ductions, viz: toxemia or infection. Some will show a different field after drinking a couple cups of coffee while others might drink a gallon or even fill up on "moonshine" and not show it, while others might take a little drink and show a marked difference.

When this happens we find poor ductions while if we get a good chart the ductions will, as a rule, be alright.

If we should find a good field chart and at the same time find weak ductions, it is then time to consider muscle treatment which will run about 5 per cent of the cases with apparent muscle trouble as about 95 per cent of the so-called low ductions will be found to be due to toxic or focal infection which we know must be handled in a different way to remove the cause, which when done, the muscles usually right themselves. For a quick determination of the cause of apparent muscle

[1]Color Field Work. M. M. Ocshier. American Journal of Optometry. Vol. 8, No. 7. pp. 215-221. 1931.

embalance one can run the two colors, red and green, which if constricted marks an advance in the diagnosis.

The Stereo Campimeter is, in the opinion of the writer, the best means for study of the central and para central fields as it is not only more accurate but also by far the quickest and easiest method by which one can do the work without fatigue to patient or Doctor. True, it does not give us the outlying portion of the field but that is not so essential except in applicants for drivers, licenses or in seeking certain positions, and in such events, that can very easily be accomplished with a wand.

The field for white is normally about 50 degrees upward and 70 downward, with about 60 inward and 90 outward. The largest field is for white with blue nearly the same, then yellow, red and green each about 10 per cent less in the order given. The Stereo Campimeter will cover a field of about 35 to 40 degrees and it gives us a means of fusional development and muscle training that is not only dependable but is rather fascinating to the patient which is no small factor in obtaining the full cooperation of the subject. In perimetry and campimetry we have a means for trail blazing which if followed earnestly might prevent us from falling into an error of diagnosis.

By having patient focus on a point central and by passing a small bright light around the arc of the perimeter, at the same time observing the light image on center of cornea, we know that while the image remains there, it is within the field of activity, and by noting the point on the perimeter arm where image begins to leave center of cornea, we may be able to determine the full field of activity of that eye; if that should prove to be unsatisfactory we then should make a complete chart for colors which is pretty sure to reveal a constricted outline of certain colors especially the red and green which, as before mentioned, indicates toxemia or focal infection which condition, of course, takes the case out of the realm of Optometry, for the time being at least, and right at this point we need the friendly cooperation of physicians, both medical and osteopathic, men who would not sacrifice a patient's health or even life rather than admit that an optometrist might possibly know anything.

Now, let us consider for the moment some of the things entering into this work which, to my knowledge, has not yet been reckoned with. First, that of color sense and color effects. If one's sense of true color is in any way impaired a field chart would not reveal the true status of that eye and might lead to erroneous conclusions as regards the health of that particular individual.

I have found that an amblyopic eye or even an eye with somewhat impaired vision, that is less than its mate, will see the color in a different shade which might apparently restrict the field for that eye for even the normal eye does not see the color as a true color in the outer field.

Remembering that the two vital or fundamental factors concerning the function of organs are living structure and vital processes. So to

arrive at a given prognosis we find that the result is dependent on a considerable number of structures and processes. We have recourse in the generally accepted principle of the reflex arc. All vital processes are carried on by stimulation of a living cell by an impulse; said impulse may reach the cell in different ways as by communication from one cell to another or from a distance by a series of structures.

Such a process of impulse conduction is referred to as reflex. Every function of the human body is a series of cell activities consisting of discharge and recovery of energy.

Hence: this field of work is so broad and far-reaching that it simply cannot be mastered by the short cut route.

Dr. Matthew Luckiesh, director of the lighting research laboratory at Nela Park, Cleveland, is known internationally as an authority on the theory of color in relation to light. This man, who is scarcely over 40 years of age, has written 16 books on science. He has little respect for philosophy, as such, because of its inactivity. He says there is no shorter cut to achievement than by the active participation in truth. Science makes its great contribution because it builds with truth. Dr. Luckiesh speaks with authority for his achievements such as developing the blue artificial day light lamp and cove lighting, a more recent development which uses light as a new medium of expression, a theory which coincides with ideas the writer has had for many years. The possibilities of color influence and effect is far reaching and a subject that should be taken up by more scientists. It is getting pretty well under way of development at present in some institutions where results are more or less gratifying.

Dr. A. F. Christian, of Boston, has succeeded in changing the color of flowers with ultra violet rays.

So by the time that electricity and colors are well understood we may be able to elucidate on the psychology of vision.

Optometry offers the best and most positive field for diagnosis of any branch of science for the very reasons that the eye is the most reliable indicator of the general physical and mental condition that we have. Whenever we are able to compel recognition by other professions when general recognition by the public will follow, we will be in a position to assume the task of covering this vast field of diagnosis directly and indirectly continguity to the eye which involves refraction, muscle tabulation, color field charting, iriodology and reflexes, all of which are being made use of in an indifferent manner by many diagnosticians; that is, some will employ one or more of these while others will employ some other of these features while none are receiving a thorough study and application.

But, now the question arises, "What about the sphere of Optometry?" The powers, we say we must know and keep well within that sphere which is correct; but why not, as Optometrists, be aggressive and extend the boundaries of our sphere by adding sufficient time

to our schools to cover all these subjects with the proper facilities for research work? This will lead to a better understanding when Optometry will come into its own and then we will have our specialists as other professions do. Our specialists will take up certain branches of the work which would be too irksome for the general optometrist to cover all but could refer his patient to the specialist for certain elements of diagnosis without fear of having that patient stolen. In the future, optometrists will aggregate in large office buildings where consultation will be convenient and congenial.

Then and then only will we stand out, not apart, but with and among the leading professions of the world with a thorough knowledge of the biological, physiological, and psychological reflexes of the eye and brain.

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HEREDITY OF COLOR BLINDNESS*

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In an attempt to find one's way in darkness, one would depend more on intuition than on definite routes. When discussing the question of heredity in general the readers would invariably discover that all solutions offered are only hypothesis and not scientific facts, many men have devoted their life's study to this branch of biologic science and found themselves surrounded with men questioning the researcher's accuracy. Galton wrote a book in 1869 entitled "Heredity Genius" in which he gives a good start to the subject. As years went by, many men attempted to bring light upon this science till finally around 1880 Gregor Mendel of Brunn, Moravia, presented quite substantial theories upon which he continually improved and which he later expanded. But with all the experimentation of many interested in this work, we are still grasping for solutions.

Before going into any discussion of Mendel's theory, we must consider a very important factor in heredity, i.e., genesis. We understand fully, in fact, it seems very obvious that some traits are transferred from parents to their offsprings, while on the other hand some traits are in no way related to the parents' habits or appearances. This must be true because some of the living cells of the body, which are responsible for reproduction, must contain something that will transfer the parents' characteristics. The sperm cells of the male and the egg cells of the female contain the "cream" of life, and within those tiny structures there are still smaller details to assist not only the development of an offspring, but also to bring about similarities between parents and their young. It is very essential to remind one of these factors before giving an account of the heredity of color blindness, for with this in mind the entire situation will be easier to understand.

We said that cells are responsible for carrying certain factors which will transmit characteristics, hence we must consider just what these cells are, or what do they contain. In like manner, as the unit of lenses is the diopter, or the unit of weight is the pound, the unit of life is a CELL. In human beings a cell is microscopic, and as in all

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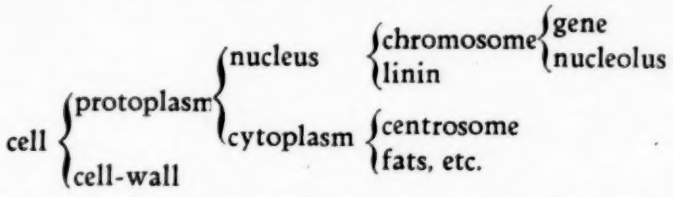
living things the entire makeup is nothing more or less than a mass of cells. A single cell is a mass of protoplasm surrounded by a thin membrane, called the cell wall. Protoplasm, chemically, is said to be composed of water, carbohydrates, proteins, fats and salts of various kinds. The protoplasm can be reduced to smaller subdivisions as can be best illustrated (as well as known today) in this fashion:



Getting down to the question of heredity, it is said that the "gene" is the carrier of heredity. In other words a cell without any nucleus could have NO hereditary abilities.

Heredity of color blindness is most peculiar. Suppose we have a color blind man marrying a normal woman. None of their children, whether boys or girls, will be color blind. The boys, it is found, will be totally free of any of their father's color blindness, while the girls will have some inheritance insofar as they would transmit to the next generation the condition, even though they themselves are not color blind. Would one of these boys marry a normal woman, there would be no possibility of color blindness in their offsprings, while on the other hand would one of these girls marry a normal man we would find on the average of 50 per cent of their sons to be color blind, but the other 50 per cent of the boys will be normal. Would their offsprings, on the other hand be girls, 50 per cent of them would be entirely free of any trace of the condition, while the other 50 per cent will not be color blind either, except that they will bear some genes for transmitting color blindness which they could transfer to the next generation.

While discussing this "approximate" relationship, let us take a color blind woman and see what possibilities her children and grand children have of inheriting color blindness, were she to marry a normal man. According to Mendel's theory all their sons, and none of their daughters would be color blind, but the daughters would have a predisposition to transfer this defect. Should one of these daughters marry a color blind man a peculiar condition would be found (theoretically). About 50 per cent of their sons and 50 per cent of their daughters would be color blind. The balance of the sons would be absolutely normal while the balance of the daughters would transfer it to the next generation even though they themselves appear to be normal.

It is quite obvious, and true, that wherever both sexes involved in the marriage are absolutely normal and free of any predisposition, there will be children as perfect as their parents. On the other hand,

would the sad condition occur of a color blind man marrying a color blind woman, their children, of either sex, will be color blind also. Would anyone ask me the question: "Suppose there is only one son, or one daughter, or an odd number of children, how could we decide, according to Mendel's theory, the results?" That I do not know, but it is logical to assume that they come in rotations (approximately) with the result that sometime it will be to the advantage, and sometime to the disadvantage to have odd number of children, wherever color blindness is concerned.

Various texts give account of this theory of Mendel's with the assistance of mathematical calculations. Scott in his book "Science of Biology" uses the symbol X for the chromosomes. He is able to demonstrate the theory and the experimentation of Mendel's by illustrating that XX represents the normal female, she having an extra chromosome in each cell, as compared to the male, hence a normal male is represented by XO. A horizontal line through the X will represent the color blind hereditary predisposition, which in the male can be more frequent for there is only one X in the XO. On the other hand in case of females (XX) we may have a line through one X only and not the other, in which case the girl is not color blind, but has a certain amount of the hereditary predisposition which is carried to the next generation as illustrated in the previous paragraphs. In the crossmultiplication of these various chromosomes represented with X, if both XX will have a line through them, then the girl in question is said to be color blind. The details of how these results could be computed by intermarriage on paper represented by these X chromosomes, would be too lengthy as space does not permit it here. The final results are given in the previous paragraphs.

We must remember one thing: i.e. that all this is theory, experimented on by many during the past and this century. Mendel's theory seems to be mostly accepted, because it seems to check most successfully.

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SYMPTOMATOLOGY OF HYSTERIA*

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Hysteria is ordinarily not a disease, but a morbid tendency of the individual, whereby the mind reacts in an unusual way to various stimuli from within or without, or it is a condition in which the bodily symptoms are due to a morbid state of mind. Hysteria displays itself often in very trivial episodes, as unjustifiable emotional explosions, such as uncalled for crying and laughing. When these reactions are very severe, persistent, and disorganizing, we call it a disease, such having a definite origin, course, and symptom. A slight degree of hysterical reaction is very common and can hardly be called abnormal.

Formerly, this affection was regarded as being confined to the female sex, but we now know that some of the forms are also seen in men.

Its chief etiology is hereditary, nervous, and moral influences. Hysteria is a psychic condition or one of simulation and moral perversion. We can discover no anatomic lesions in the nervous system or structure, but paralysis and other disabilities appear to be quite lasting, like those of definite pathologic lesions of a same organic disease and will easily confuse the examining physician.

Ocular manifestations in hysteria are not only constant and characteristic, but a sure guide in diagnosis of certain neurosis. Hysteria should always be investigated from the physiological, and not from the anatomical standpoint.

Hysterical symptoms do not mean pathological lesions, but perverted nerve function. The ocular stigma of hysterics constitutes a distinct symptomology of permanent or temporary affections of sight. It is hysterically possible to produce a convergent strabismus, but impossible to produce a divergent one. Ocular disorders may affect the sensory nerve elements (Hysterical Amblyopia) or the motor nerves of ocular muscles, interferring with movements of the eye ball or lids.

The predisposing causes are usually heredity. In about seventy-five per cent of all cases, we can discover some neurosis or psychosis in the parents and especially so in the mother. It is usually a disease of adult

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life occurring between fifteen and thirty in females, and later in males. Children are apt to be very hysterical between ten and later in life, and by far more severe.

Male hysteria is more frequent in the poorer classes, dissipating in alcohol and who are more subject to poverty, etc.

The most important single factor of hysterical attacks, is the emotion of fear. It is also characterized by a definite hysterical temperament of emotional weakness, nervousness, hyperaesthesia, anesthesia, or pains. Such patients, usually a young woman, develop undue sensitiveness, has a depressed mind, gets easily alarmed, lacks control over emotions, laughs and cries easily and yields to most any impulse. She easily suffers from headaches, sleeps badly, often has disagreeable dreams, and may have tickling or fullness in the throat known as "Globus Hysterious."

The after affects are general muscular weakness or myasthenia. These people have continual unreasonable grievances, opposing all good friendly suggestions, think themselves being misunderstood, are very selfish, and quarrelsome. In domestic life they are a great source of trouble and unhappiness. The emotional crisis of crying, laughing or anger without reason, usually bring on a squeezing or pressing sensation of the throat and this is due to anesthesia of the nerves supplying these parts.

The defect of vision which accompany these disorders, are like all other symptoms, purely functional. They do not depend upon any disease of the retina or other portions of the visual apparatus, but merely upon the derangement of these parts, therefore no pathology can be found upon examination.

A fluctuating acuteness of vision is very common and effort of the individual to see well, is often the signal for the acuteness of vision to fail.

The Optometrist of the future must understand and be able to observe these symptoms or else he will discredit his fellow and keep changing glasses at his own expense. We must learn the individuality of our patients, study their psychical, physical, and social problems. We cannot treat them like basic materials and can't do refractions on them in a stereotyped manner. It is the Optometrist who can often detect early pathological conditions and refer them to some medical man for proper treatment, when such is possible. The best Ophthalmologist can not bring sight to an old Glaucomatous eye, but can preserve such if early recognized and referred to him for treatment or operation.

The most important and characteristic symptom of hysteria, is concentric contraction of the fields of vision, measured by a perimeter or compimeter, using a small test object. Accompanied with it, is often, a form of dyschromatopsia (reversal of color fields).

We also have concentric contraction of fields in optic atrophy and Glaucoma, but we have visible pathology to account for it.

Hysterical concentric contraction often has fatigue fields, that is, if a test object is brought from the periphery to the fixation point, and this is repeated several times, the outside limit of the field will become smaller, the longer the examination is continued. Whether this exhaustion of the visual nervous apparatus is in the cerebral center, the optic nerve, or the retina, is not known, but the exhaustion is most marked in the periphery of the field. Normally, the boundary of the field is not much affected by prolonged examination. Visual defects, due to pathology and organic disease, may be greatly aggravated by hysterical functional blindness. In fact, hysteria may be found to be superimposed upon any pathological condition and if so, often gives rise to some miraculous cures by various healing cults, who, not being able to differentiate the true condition, or not willing to, promptly take credit for such accidental improvement.

In tabes dorsalis or Optic atrophy, contraction of the field may become increased by worry or other intercurrent general illness, but becomes restored to its former dimensions, with return of a calmer state of mind and improved health, but not so in hysteria. We also find symptoms of deranged nervous function in other parts of the body.

Spasm of accommodation, that is, accommodative failure, is often associated with visual and muscular defects. Contraction of the field of vision is due to insensibility or anesthesia of a portion of the retina to light. Contraction of the field for white, is usually accompanied by similar contraction for red and green, but there may be an exception to this rule. Contraction often diminished during the examination, due to efforts of fixation and fatigue. The field will be larger if the fixation point is moved from the center to the periphery, than if moved the opposite way.

Peripheral vision is sometimes entirely abolished and often to within ten or fifteen degrees of the macula. If central vision is affected, even very powerful light may not convey luminous impressions to the brain. We often increase the visual field by giving the patient glasses, the amelioration of which cannot be explained by the refractive error in question, as even neutral glasses will sometimes have similar affects. It seems that we can modify hysterical amblyopia by stimulating accommodation. It may be due to suggestion or to instinctive tendency to relax or contract accommodation when glasses are placed before ones eyes.

The strange thing is that a dim light will often give us a larger field than a bright one, accounting for the old method of prescribing blue tinted lenses in special cases.

The narrowing of the visual field, due to insensibility of white light, is a fundamental fact in hysterical amblyopia. The field for red, seems to be least affected, while in tabes dorsalis or alcoholic amblyopia, red is the first color to disappear or be greatly lessened.

Alcoholic toxemia of the retina has a color scotoma for red from

the center towards the periphery, while in hysterical retinal anesthesia, the red field is concentric. The visual acuity may be low, but often due only to accommodative anamalies and difficult to estimate, due to its great variance. The punctum proxium and the punctum remotum are not constant and visual acuity depends often at the distance at which it is taken. This condition will even cause monocular diplopia, of which the patient does not complain, but only of blurred vision. Any small object held nearer or further from the eye, may at some distance, manifest diplopia, or at least cause confusion circles, as the eye can not accommodate for certain distances. The amplitude of accommodation is very poor and fair visual acuity at certain points, and between such points, blurring or double vision is not common.

Hysterical spasm of accommodation also changes the size of the objects looked at. It will make small objects appear in relation to the size projected on the retina, that is, that normal mental interpretations of size and form, seems to be missing, or is greatly perverted. The most peculiar part is that the pupil of hysterical and very amblyopic patients will react to light, while such is not the case in optic atrophy or other pathological blindness. Luminous impressions are not perceived by the nuclei as visual impression, but the nerves carry visual stimulation sufficiently to activate the pupillary arc. In other words, we do not see objects, but perceive nerve stimulation at the nuclei sufficiently to act on the pupil.

Hysterical individuals do not seem to suffer from severe contraction of fields, the same as patients suffering from other pathological disturbances and ocular diseases.

We may not be able to demonstrate retinal perception by any means at our command, yet it has been demonstrated that hysterical patients complaining of complete blindness in one eye, will sometimes have binocular vision, apparently due to destruction of the image of one eye, by a physic agent, when examined separately. Some call it "Blindness of the Imagination."

Hysterical visual symptoms as transitory amblyopia and peculiarities of vision in squint, are no doubt, due to certain relations of the retina and the visual brain centers of monocular, binocular, as well as central and peripheral vision centers.

According to Charcot, questions of hysterical visions are not settled by anatomical explanations, but by physiological laws. There is really no way whereby we can explain and understand hysterical functional processes by our present knowledge of functional visual perceiving apparatus, and is usually accompanied by disorders of sensation of the skin, conjunctiva, mucous membranes of the pharynx, etc. Often there is loss of sensation around the amblyopic eye. Transitory hemiopia, characteristic of Ophthalmic migraine or scotoma scintillans and which may be just a form of hysteria.

Of all hysterical eye affections, those of disturbances of accommodation are the most frequent and are essential in the nature of spasm of accommodation or even as bad as simulating incomplete paralysis. The amplitude of accommodation is diminished on both ends, bringing the punctum remotum and punctum proximum closer together, acting either presbyopic or as in spasmodic myopia.

Myopic spasm is always hysterical, if accompanied by contraction for fields, and can easily be distinguished by retinoscopy under atropine.

Nervous Asthenopia is a name applied to incapacity of the eyes for continuous close application, in spite of the fact that we have good visual acuity and apparently normal eye movements.

Of course, we must first rule out all errors of refraction or of muscular equillibrium. Other cases may be influenced by reflex disturbances such as: focal infection of the teeth, sinuses, tonsils, etc.

School children are often brought to us with a complaint, that sight is confused and the print disappears as they look at it, and that reading causes smarting of eyes and headaches. If such patients are asked to read aloud, they will soon stop, saying that the words are running together, the book is brought closer to the nose, and a few more lines are read and the book is held still closer. This is typical of rapid hysterical exhaustion of accommodation.

Insufficiency of the internal recti is also present, contributing to the difficulty of near work.

If a child, nearly emmetropic, is obliged to hold fine print further away to read it plainly, or when plus 1.50 lens improves near vision greatly, a mild form of hyterical spasm of accommodation is present, providing, however, there is no history of a recent case of diphtheria with possible paresis of the ocular muscles.

The main difference between hypermetropia and hysterical spasm of accommodation is, that in hypermetropia fatigue in reading will occur after prolonged near work, often several hours, while in hysteria, fatigue is more rapid, often after very few minutes. Letters seem to be displaced or doubled, pain in the head may appear with it or patient will complain of a peculiar sensation of dragging of the eyes. This may be severe enough to cause vertigo or a sensation of nausea.

Many so called ocular pains, which are not explained by refractive errors or muscular anamolies and which cause us so much trouble and changing of lenses are truly hysterical manifestations. Pain is complained of as being ocular, deep seated, pericorneal, or above the orbit. Upon pressure such pain is not found as in neuralgia.

Hysterical pain is easily influenced by emotional disturbances, excitement, insomnia, etc. Photophobia is less common, but patients may complain that certain colors hurt their eyes.

Under normal conditions, ocular movements are always associ-

ated, and they are excited simultaneously in both eyes. Such movements are of two kinds:

1. Fixation at different distances or associated movements of convergence.

2. Function fixation of different directions or associated movements of direction.

The so called insufficiency of the internal recti, is no more present in hysteria than in any other disease. We must realize that in hysteria, not muscles or nerves, but the higher nerve centers are affected and are brought in unison with psychic action.

Hysterical disorders of the ocular apparatus are referable almost exclusively to the associated movements of convergence and of direction. Hysterical disorders are usually always in the nature of contractures and present the objective characteristic of paralysis. Bahinsky called these "Sympathetic hysterical Paralysis."

Hysterical contracture may also have incessant movements, that is, may have lost the power of fixation. Such movements are usually incoherent and are accompanied by photophobia and blepharospasm. Some patients complain of transitory diplopia, recurring several times per day, and upon systematic examination, no trace and cause can be found.

Hysteria is sometimes produced by injuries (Traumatic Neurosis). Any result obtained in its treatment is to be ascribed to psychic influence upon the patient, when he has full confidence in his doctor and is convinced he can cure him.

It is for this reason that many physicians resort to all kind of electrical apparatus for its curative and psychological effects.

Adults suffer much less from inability at near work than is the case in school children. Adults come complaining of unpleasant and painful sensations in and around the eyes. The eye may be very painful on pressure at some one spot without apparant cause and these patients will complain of uncomfortable sensations, such as: colds, burning, or dryness under the lids. If there is an error of refraction it is very difficult to find glasses with which the patient will be content, the bridge, temples, etc., annoying them with the slightest pressure, even the reflection from the edges of the lenses or the frame causes them grief. Distant vision is relatively easy to correct, but any attempt for near work, causes headaches described as a pressure on top of the head. Any make of bifocal, is not satisfactory if prescribed for such patients.

The treatment consists in tinted lenses, abstinence from near work if possible, anything which will build up bodily resistance, such as cold sponge, or shower baths, walks in bracing air, short of fatigue, light, diet, plenty of sleep, and any treatment strongly suggesting, even to the point of Christian Science.

Among the more common abnormal psychic manifestations, are obsessions, fixed ideas, anxiety states, various convulsive acts, as tremors and general convulsive states of psychogenic origin. There are usually two outlets for the expression of manifestations. One through the psychic channels and the other by the somatic pathways. One group expresses itself in a variety of multiple unrelated phonomina, while the other gives rise to visceral symptoms, simulating a picture of organic diseases.

There are many causes for sensory or motor disturbances as stated above. Often, disturbances are only of a fleeting character and usually of psychic origin. The study of these patients must also include the sympathetic endeavor to properly understand their reactions, with reference to their surroundings and environment.

A careful study as to their emotions and motives actuating them, as well as the character thereof, is very essential. Social maladjustment, unfortunate environment, domestic trials, poverty or repressed sexual emotions, any or all of which are at least contributary or directly responsible.

Proper advice along such channels is of great help to your patient and may be classed under "Suggestive Theurapeutics."

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Case No. 1—Occasionally the Optometrist will be called upon to determine the amount of damage to an eye in civil cases for the purpose of collecting damages, or in the defense of such action.

A recent case came up in which a suit was pending, on account of the supposed loss of an eye, from a blow while in the employ of a certain corporation.

In the meantime the prosecuting lawyer sent the patient to the optometrist for an opinion.

The examination proceeded by first covering the supposed blind eye, with the remark that we would also test the good eye to see how much this eye was also damaged, at the same time stressing care to keep the blind eye carefully covered. We began by placing a block 10° prism over the good eye so that the extreme base of the prism intersected the median angle of the pupil, which caused the patient to see two lines of 20/20 letters. We insisted upon the patient to be certain he saw the double line with his sound eye. He was certain.

We then deftly raised the prism a little and at the same time uncovered the supposed blind and again asked if he was sure he still saw the double line of letters. He was sure, and we were sure that this was an unfavorable case to recover damages.

The ophthalmoscopic findings and pupillary reaction both direct and consensually were normal.

Case No. 2—Another recent probable damage case of a young man, age 25 years, who received a moderate blow upon the vertex of the head while in the employ of a corporation, and who claimed the loss of the sight of one eye.

The pupillary reflexes of this eye directly and indirectly were poor. The pupil was slightly dilated.

The ophthalmoscope revealed extensive hemorrhages, little tortuosity and dilation of the veins and odima that obscured the optic disk. Examination of the sound eye revealed arterio sclerosis with a systolic blood pressure of 165 with a history of lues about a year previous. No doubt, the previous degeneration of the vascular disease may modify the amount of liability.

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OPTOMETRY'S EDUCATIONAL PROBLEM*

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(Continued from page 223—June Issue)

We all know that there is a certain amount of questioning in the minds of many members of the medical profession as to the optometrist's ability to care for ocular problems, due to the lack of professional training of a great many who entered the practice of refraction in earlier days. This will right itself when a very large number of our practitioners have received a training equal to that now demanded in other professions and not until then. For the assistance of future optometrists, for the perpetuation of this profession that many of our predecessors who have now passed on, planned, worked, sacrificed to push forward, that many of our members now living are generously devoting much time and much money to lift to a higher plane of efficiency, we are forced to raise our standards step by step to the level of current standards of the other professions.

To stand still while other professions are raising their standards is to be left behind in the race for economic independence. The members of our profession must raise themselves to a par with the plane attained by other professions and recognized by the public as professional standards or they will not be able to gain that financial status that will enable them to remain in practice.

There are those who say that the financial rewards of optometric practice are not sufficient to induce an ambitious young man or woman to spend a very long time and a very great amount of money in preparation, that the public is not accustomed to paying fees in proportion, so that a thorough preparatory training is not economically a paying venture. But that is not the public's fault, it is the fault of those who designate themselves "optmetrists" but who speak of themselves as "in the optical business" and do not deliver service worth a fee over and above the price of the "optical hardware" they sell.

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*An abridgement of the material presented before the American Academy of Optometry at Omaha, December 15, 1930

The experience of the past year of depression has plainly shown that those who are practicing professional optometry have scarcely felt the hard times, some have even made more this year than ever before. While those who say they are "in the optical business" are having a bad struggle. We know that there is a very large percentage of the public, a rapidly growing percentage, that prefer visiting the specialist and paying him a high refraction fee than to visit the optometrist-optician whose fee is included in the price of a pair of glasses.

The reason is that the public is more and more demanding professional environment, or what it has come to look upon as professional environment. People are becoming more and more prone to gauge the man by the surroundings in which he puts himself. They evaluate him by his bearing, by his mannerisms, by his speech. The college trained man betrays himself, the untrained man betrays himself. The public is beginning to show very definitely what it wants.

If we compare the earnings of the average physician with the average earnings of the professional optometrist, the latter is doing a bit better. If we compare the average earnings of the general medical practitioner with the average net income of optometrists of all ranks, the latter is doing better if we take into consideration the return on money invested in preparatory training and equipment. We envy the dentist for the fees he is able to command. How did he reach that point? By better training and by no other means. But we are prone to note only the outstanding successes. We have professional optometrists with net incomes every whit as large as those of the better dentists.

The argument of insufficient return to make increased training economically profitable is vitiated by the experience of every other trade and profession. And the trades are now increasing their educational standards and requirements. We must do likewise or be wiped out.

A favorite argument against increasing the length of optometry preparatory study has been that this would reduce the number of students. To a certain degree, we might assent to this, if it were not for the fact that the Pennsylvania State College with its three year course is constantly growing, that applications for entrance have been greater than the facilities of the school could care for, that the rate of increase under the three year standard is more rapid than it has ever been in any school with a two year course. There is another point that has been too carefully hidden. There is not an extremely large percentage of the graduates of the short courses still in practice. Of one class of 22 graduated from a two year course in one of our schools twelve years ago, there are only two now in practice. The reason, of course, is that those who dropped out were so ill prepared for their work that they could not succeed. It is too early yet to learn what percentage of the three year graduates will succeed and remain in practice, but we will have to admit that their chances are better.

The argument is valid that requirements must not be raised to the point where the profession will be extinguished. But there are

two sides to that, the requirements must not remain so low that a discriminatting public will have naught to do with us, nor that professionally minded young men casting about for a life's vocation will be repelled. When we note the comparatively small percentage of two year graduates who remain with us, we must concede that our permanent numerical force is not necessarily built up by attracting a large number of students by easy entrance requirements to our schools and short courses for graduation when only a small part of them have any chance to succeed and remain with us. Rather, we should make the preparatory training so good that they have the opportunity for success, granting that this particular type of work eventually proves interesting to them. There will always be a few who find they were mistaken in their choice of life work and who will naturally change to something they enjoy better.

Further, public recognition of any profession is measured by the quality of service rendered by that profession. We do not gain public recognition by thrusting out a great number of immature and untrained practitioners. Such a policy would surely lead to self destruction. Our past experiences ought to be sufficient evidence of this.

Here we have some experience on which to formulate an opinion that will be at least partially valid. During the past ten years there has been a great deal of discussion and planning as to how to take care of the newly graduated student. That has come about through the recognition of the fact that he has been so poorly prepared in school that he is not capable to start out in practice with any great chance of success. Looking over the field of graduates who have embarked in practice for themselves immediately after graduation, we find there are some who have succeeded from the very start. And we find that they are those who were so fortunate as to have had teachers who took the trouble to give them something further than the course in text book material that would enable them to pass the state board. Here and there we do find the occasional teacher who goes outside the written curriculum of the school's program and gives his pupils some practical picture of what awaits them, instructs them in office procedure and takes particular pains with their clinic experience. Here and there has been a student who simply forced practical instruction out of his preceptors. And then we find that in schools where a great deal of clinic work is done, that the graduates do well when they start in practice. I have noted with much interest some graduates who have voluntarily remained at school for an extra year for clinical experience and did splendidly from the very start when they opened their offices.

In traveling about the country, I have taken especial pains to find out how the young men and women are making out, those who opened their own offices immediately on graduation. I find quite a number who had pretty good training under practicing optometrists before going to the optometry school. These always do pretty well from the start.

Some students did a great deal of studying while at school that was not included in the curriculum. Some of them worked with practicing optometrists during their school years. Some of them managed to get in a great deal of extra clinic practice during the last semester of school life by playing up to one or two of their teachers. All these get started in practice with no particular difficulties, aside from the natural fact that they have to wait a time for volume. Some of them have started right in with the idea that they are going to solve every case, no matter how difficult, if it is at all possible to do so, they are not contented with the mere sale of a pair of spectacles. These keep up their studies, spending many hours each day with their books. This latter group prosper amazingly, as might be expected. It is those who are shot out with no training that have trouble, they were prepared for the state board but not for practice. The comparison of the progress made by the graduates of different schools is an astonishing commentary on the schools themselves. Those who took an extra year of clinical work are the ones who get along most easily. We need not worry so much about caring for the graduates of our schools as we should worry about the instruction that the under-graduates are getting. Take care of that part and the graduates will not need much of your help.

But there have not been many schools that were prepared to give their two year graduates an extra year of practical training in clinical practice. The graduate who feels that he would like some practical office work before opening his own office tries to get himself placed with some practitioner. But here the trouble is that those who wish to employ assistants are too seldom of the type of professional practitioner whose example we would like the newly fledged optometrist to follow. And if he gets a "job," it is as assistant shop man, to be occasionally called to the front when there is more of a rush of "business" than his employer can alone care for. Many a promising youngster has been ruined because of the unfortunate environment into which he was forced, having fully realized that his school training was altogether too little.

The school's answer to this has been mostly in enlarging on the mechanical, or shop, training, so that when the graduate starts out on his search for a job, he can earn a living by being an optician even if he has not been prepared in the school to be an optometrist. To this day, some of our schools give more hours in shop work than in the clinical practice of optometry.

Yet today's professional optometrist, save in the occasional case of the man in an isolated small town, does little or no mechanical work. The prescription houses have so increased in numbers and in the speed with which they can deliver the finished lenses that it is far more practical to order the prescription made up than to do it ourselves. The only one who can afford to have his shop work done on the premises

is the man with a long established practice, or the group of the three or four men in one office whose combined requirements will pay the expense of the maintenace of a shop. We have carefully figured out the cost of lens edging to the man with a small practice, as the young graduate in his first two years. Averaging the number of lenses used by 20 optometrists during their first two years, we find the cost of edging their own lenses is $.40 per pair more than the list price of the best prescription houses. This includes cost of lenses, interest on money spent for required machinery and cost of power. It does not include time, allowance for possible breakage, nor loss on accumulations of lenses of odd powers not often needed. We may well insist that our schools shall now spend less time on producing mechanical opticians and devote that time to producing practicing optometrists. For instance, none of our graduates from any of our schools are competent adjusters. Less time at lens grinding, more time at frame fitting, might prove a profitable exchange.

Our first schools, quite naturally, were developed by a few men, here and there, who had proved somewhat successful in practice and were asked by their neighbors to teach them some of the practical points they had picked up and to explain to them the meanings of some of the technical terms appearing in the five or six books that then constituted the entire literature of refraction. Slowly these schools grew, students came from distant towns, all of them, of course, men who had been dabbling with spectacle fitting. Then younger men, attracted to the field of refraction by one way or another, began to appear. Instruction was rather casual, unsystematic, consisting only of those points of which the instructor knew more or less, and entirely his own, personal ideas. Some of the schools grew large enough so that one or two assistants could be employed to teach such subjects as elementary optics, with perhaps a little smattering of text book physiological optics. The length of the course depended entirely on how much money the student had to spend. Quite naturally and quite properly, the only reason for the school was the profit the owner could make out of its operation.

We may feel disposed to laugh at these schools now, but we must not criticise them. They did the best they could under the circumstances. If it had not been for them, we should have nothing today. Some of these instructors were true teachers, some of them cared for nothing but the few dollars they made. Some of them labored mightily for the advance of their profesison and had visions of its marvelous future. Some of them did not do so much. Some of their students are our foremost men today. Some of their students have been nothing but a drag on us. Optometry of today and tomorrow had its birth in these rather primitive schools. For here and there was a teacher and here and there was a student who was not content with things as they were, but ever strove for improvement.

But there came a day when these unsystematized schools with their irregular courses became inadequate and in some of them the ideals were so low that organized optometry, in self defense, was forced to take steps toward standardization and regulation.

In 1921, the school owners were called into conference with the representatives of the state boards of examiners. Only a few of the state boards were represented. A great many of the school owners were strongly opposed to this conference. Quite a number did not attend. At that time there were between 25 and 30 so-called schools. Very few of them had any ideals, they were opening and avowedly money-making propositions, evidently caring little or nothing for progress, only concerned with the tuition fees paid by those who attended, resentful of the increasing demands of state boards, criticising the board of any state who made examinations at all difficult. It was a critical time and only the wisdom of those practicing optometrists who demanded the conference saved the future of optometry. This conference finally arrived at a standard, requiring high school graduation for entrance and 2,000 hours of instruction in certain specified subjects. It was a wide step forward.

But immediately after the conference, as is the case with so many agreements where there are no practical means for maintaining the agreements, most of the school heads went home, later evidence shows, planning how they could legally avoid the spirit of their contracts. We cannot blame them for this, since they had to have students of some sort or they could not keep their schools open. Had there been but a few schools instead of nearly thirty and had those few schools been then endowed, the spirit of the new regulations could have been held.

The new rules required that the entering student should have completed high school. This was avoided in some schools by merely asking the prospective student if he had finished high school, without demanding his records. The unscrupulous student could answer "Yes" to this question and I personally know of a number of instances where this was done. I am not citing these instances in a spirit of condemnation of the schools, but to point out the inherent weakness of a private school system in a field where at best there are but relatively few students. Another way of taking on a student with limited means was to give him advanced credits so that he could finish within the time that his money supply would hold out. The advance credit system when a student has actually covered the work and passes an examination in it or presents credentials from another school showing he has completed the work is a proper policy, of course. Here we see how it can be abused when we are so short-sighted as to require our schools to be self-supporting.

To meet the 2,000 hours of class work requirement, some of the schools resorted to padding, repetitions of the same courses so that

there were many instances where a class repeated the work under one teacher in one subject four times, going over the work each semester, for the four semesters of the two year course. There were two reasons for this. One, that having admitted students to advanced classes when they had not had the preparation, the work had to be repeated for their benefit, the students who had taken it once being put to this disadvantage of repetition for the advantage of the newcomers. The other reason, with a small faculty, with insufficient funds to employ other teachers, with insufficient funds to pay for more than an hour or two a day of each teacher's time, it was out of the question to do anything else. Another item might be entered here. In some cases, the school head himself had so little vision of the optometrist's educational needs that he could see no reason whatever for this 2,000 hours of class work. Only five years ago, the owner of one of our largest private schools published an article attacking the two year course, stated that it was unnecessary, that there were not enough subjects to fill in the time.

I repeat these unpleasant matters, not in a spirit of hostility to or censure of any one of those schools, but only to draw your attention to the conditions that changing times create. Had these private schools never come into existence, had their owners not been able to make a living out of their conduct, we could have had no schools whatever, we could never have reached our present state.

But when we arbitrarily set standards—and these standards had to be set for the protection of our immediate future—standards that made the conduct of these schools financially difficult, we should have done something further. We should have bestowed such endowments, in worthy places, as would have made these standards easy to meet. Perhaps it was as well that we could not, at that time, for we might have endowed the wrong places. That matter has been automatically settled for us. The unworthy could not survive under the conditions created.

The next forward step in standardizing the schools was their grading according to their facilities for giving proper instruction. We are indebted to Professor Woll for undertaking a vast amount of detail work and the absolute impartiality with which he made these gradings. There were few schools that could meet the requirements of the Class A rating. I may be wrong in this, but I have understood, not from official sources, that there were two schools that were ready for Class A rating. The others were given a period of a few years to raise themselves to that mark. Only one has done so, and as one of the first two has been discontinued, now we have two Class A schools outside the universities. Meantime, several state boards had raised their standards to demanding graduation from Class A schools or universities. The result has been that most of the lower rated schools have gone out of existence. I believe there are only two Class C schools now operating. I have understood that one of these is contemplating a three year

course and that an endowment proposition is being considered for the other.

Meantime two universities offered courses in optometry. Columbia prepared the way for higher education by first giving a two year course in professional optometry in its University Extension Department. We heard many critical remarks about this, which were entirely unjustified. This was really a wise move, showed the wisdom of the university authorities and of the optometric leaders who took part in the move. Its wisdom has been amply demonstrated by its results. We were not ready for full university courses. No considerable number of our practitioners had the vision of an optometrist requiring university education. Optometry as then generally practiced was not much better than a high class trade, although there were a few men, here and there, who had raised themselves, unaided, to a professional plane on level with the highest standards of any profession. We had neither teachers nor students for full university courses when Columbia demonstrated its liberality of view by making a place in its Extension Department for this foundling. We needed just this sort of an experimental place where something could be learned about teaching optometry. And we must never forget that Columiba opened this door for us without asking for endowment.

Ohio State University offered a four year course in Applied Optics at about the same time. "Applied Optics" being interpreted in this instance as the study of the art of refraction. A few years later, the University of Illinois offered a course in optometry. There has been but one non-medical student to take the course. Founded by optometrists, its institution in the university antedated its need by many years. Each year, however, instruction in optics and in refraction is given to a few students from the medical school who contemplate entering the practice of ophthalmology.

For several years, the optometrists of California labored to get a course in the University of California in Berkeley. They finally succeeded by taxing themselves under the state law for $8 per year from each registered optometrist to be paid into the treasury of the State University. This is equivalent to an endowment of, in round figures, about $200,000. An equal spirit in every state in the union would put us in position to solve all our educational problems. A similar contribution of $8 per year from every registered optometrist would give us an established endowment of about $2,500,000. That divided among five leading schools would give to each an annual income of $25,000, which would enable them to educate our students well, give funds for research, pay better salaries to their teachers, so make teaching more attractive to ambitious men than it now is, give us a better type of teachers than we can expect our schools to employ when their only resources are the fees paid by students.

In 1926, Columbia and Rochester Universities, to meet the

demand made by the new state law in New York, offered four year courses in optometry. Columbia again with open heart and purse did not ask us for an endowment. Due to the liberality of Mr. Bausch and Mr. Lomb and their families, the department at Rochester has ample funds.

In 1928, the School of Optometry in Los Angeles leased school room and clinic space in the University of Southern California and made co-operative arrangements such that the optometry students could do some of their work in the university classes. In 1930, the University of Southern California formally instituted the teaching of optometry in the department of physics-optics. Again the optometrists of California showed their spirit by subscribing about $7,000 per year for a period of four years to get this course under way. This in addition to their support of the courses at the University of California, at Berkeley.

I have purposely left to the last mention of optometry's endowed independent schools. We have had none with a permanent endowment. The Rochester School of Optometry was one with the finest of educational ideals. It losses each year, its expenditures on its students over and above the tuition fees they paid, were met by Mr. Bausch and Mr. Lomb for many years. When the Institute of Optics was founded in Rochester University, and the state law required that optometrists possess a bachelor's degree, quite naturally, the school's usefulness was at an end.

Ten or eleven years ago, under the inspiring leadership of Albert Fitch, a group of optometrists organized a new kind of school, the Pennsylvania State College of Optometry. This is not a privately owned school. It is owned by optometry. It is not run for a profit and each year's losses are made up by a group of men who put their hands in their pockets and meet the bills. It would have been impossible to have so conducted this school, even with the generosity of these men, had it not been for Dr. Fitch practically giving his time. Had it been necessary to pay a dean the salary the owners of private schools must get, in addition to a return on their investment, this school could never have been.

It is now optometry's opportunity and duty to make the endowment of this school permanent, not dependent on the generosity of a few men. It is now optometry's opportunity and duty to equally endow one or two other schools, the best of the present private schools if they wish it, so that in each section of this wide country there shall be an accessible educational institution.

Our earlier schools were merely places of instruction, not much different from trade schools. Students were taught to do things in a certain way, the way their teacher had learned. They were not taught why they should do them, because usually the teacher did not know why. They were crammed with text book definitions so that they

could answer state board examinations. They were not taught how to conduct a practice, they were shoved out into the world with the vaguest ideas of what they were to do.

The clinics were run ostensibly to give the students practice in refraction, but in reality they were free examination places where the client was inveigled to come in by the lure of the free examination and then sold a pair of glasses, or two pairs or three pairs if he showed signs of a deep pocketbook. So far as this aspect of the clinic, it was not one bit different from the free examination places we see about our city streets and against which we have so much to say. But we cannot blame the school owner, he had to do this to keep his school open, under the conditions then prevailing. Schools varied, of course, in the method of using the students in the clinic and in the amount of work they were enabled to do. I know of two schools where the patient was turned over to the student for a time, then allowed to go home and rest up, then come again and this time one of the instructors made a real test and prescribed the glasses. Many times the student never saw the patient the second time and never knew whether the correction he laboriously dug out was usable or not. In an endowed school, this need not be the case. A school clinic must not be operated as a money-making proposition.

Instruction is not education. Instruction is merely teaching some one to do a thing in a given way. Education is teaching him why things are to be done. Then he can do what he has to do in an intelligent way. A purely instructional trade school can be self-supporting. An educational school cannot be self-sustaining, unless the tuition fees are put very high. And that in itself ruins its chances of self support since it reduces the number of available students.

The average expenditure of the colleges in this country is about $350 per student for each $100 the student pays in tuition fees. You may moan about the cost of sending your boy or girl to college, but remember that you could not send them at all if it were not for the munificent gifts made by those who are so intelligent as to realize that the rich man's best protection for his fortune, the business man's best insurance of continued good business, is a well educated populace.

Optometry's prosperity lies in the education of a group of practitioners so well versed in their work that the public becomes dependent on optometry for its eye care. The more good optometrists there are, the better will be your business and my business. It is merely intelligent selfishness for each of us to lay aside a small part of our annual incomes and devote it to the education of young men and women who shall come into practice as our next door neighbors and, having been well trained in their work, shall so apprise the residents of our own towns and cities that they learn what an optometrist really is, so raising every optometrist, including ourselves, in the estimation of the public. That

is the surest, most logical method of increasing our own prestige, our own practice, our own incomes.

Optometrists in the field have always expressed dissatisfaction with the instruction given students in our various schools, both the earlier private schools and the more recent courses of optometry in universities. For these practicing optometrists found that the graduates of these schools had been given very little of a practical nature that would be of material use in the actual refraction of a patient seeking visual aid and comfort.

The graduates themselves, after a year or two in practice, have learned that they had received very little technical training in the problems they must meet and that they had received no enlightenment whatever in the professional business end of their work. Many of them have expressed themselves quite forcefully, sometimes quite bitterly, on the inadequacy of their training.

Despite this, our schools have shown but little disposition to rectify or improve the situation. There is one striking exception to this generality, the school organized, endowed, supported by practicing optometrists. But this school came into existence under different conditions than did the other schools, and was in fact an attempt to answer the problem we have stated in the above paragraphs.

Perhaps the trouble lies more with ourselves than with the schools. We have not instructed the school heads as to what the requirements of a practicing optometrist are. In this connection, we must remember that we have comparatively few successful practicing optometrists engaged in teaching optometric students and that there is not much contact between some of the schools and practicing optometrists, in which boh sides are probably at fault. And we have not made the financial problem easy to handle, for we are forcing our schools to be self supporting.

The private school must have volume or it cannot exist. It cannot inquire too closely into the preliminary preparation or the special qualifications of its students. It must operate on the minimum of expenditure for equipment and teaching staff. It must have the maximum of enrollment. It cannot set up barriers that might tend to reduce enrollment. It cannot concern itself with what happens to its graduates. It can only carry them to the point of getting past the state boards. Some schools have taken students on a guarantee to get them by the board, but of course would not give a guarantee of subsequent success. The privately owned school dare not look toward courses of instruction that would produce competent practitioners, for such courses would look long and costly to many prospective students. The private school must present a plan of a short preparatory course, a minimum of cost in tuition, with the bait of a possible income after graduation grandly disproportionate to the expense of instruction. It must popularize, it must seek quantity, it cannot afford to ask about

quality in its students. It dare not look squarely in the face the fact that the majority of its graduates fail. The private school cannot answer a profession's demand for trained graduates. The profession must endow these schools, then it has a right to demand properly trained graduates. So long as we ask the schools to be self-supporting, we have no right to criticise their output, no right to ask them to increase the tuition given. Not until we rid the head of a school of the problem of making a fair business profit on his investment and as a reward for his risk and speculation, in addition to a comfortable salary, can we require him to conform to a very high educational standard.

The endowed school is not so limited, it is independent. It can pick and choose among the applicants for entry, it can insist on sufficient preliminary preparation so that the time of its instructors is not wasted in teaching the unprepared student in subjects he should have covered in school. It can demand of the entrant a showing of good scholarship in high school or college so as to insure a good grade of scholarship in the professional school. It can and must study the practical need of its graduates beyond the mere passing of state board examinations, since its future depends on the ability of its graduates to succeed. It can and must meet the requirements of those optometrists now in practice who have in the past been critical of the optometric graduate, since it is maintained by the contributions of those practicing optometrists. It can devote all the tuition fees paid in by students to their instruction and the purchase of equipment for their use, since no provision for profit taking need be made. Its clinic can be operated for study and research, since it need not be run for money making. It can and must develop better teaching methods; since the load of money making is taken away, it will have funds and opportunity to reach out, to try new methods, to test and experiment. Its graduates must be better prepared, for more instruction can be given them and that increased instruction is dependent on the liberality of the subscribers to its endowment fund. A larger percentage of its graduates will stay in practice, for they will have been better prepared to cope with the problems they will meet. The slight reduction in the number of students due to insistence on adequate preparation and mental maturity will be more than offset by the increased proportion that will be permanently added to the number of practitioners.

Again we call attention to the fallacy of the reasoning that assumes that a large number of students in incompetent schools with a large number of graduates inadequately prepared means an increased number of practicing optometrists. What we most need is an increase in the number of competently trained optometrists. These we cannot expect from a private school system. I am not finding fault with the private schools, the quarrel is with the condition that makes necessary private schools with their financial handicap. A school is not successful in proportion to the money it makes, when we view the situation from

the needs of a profession, but it is successful in proportion to the money it loses through its intelligent expenditures. If we are to build the profession we dream of, we must put our schools in the position where they can lose money in the education of skillful optometrists. If we want the public to regard us with the respect accorded to learned professions, we must graduate learned men. And we must not look for a saviour from without, we must ourselves be the saviours.

To sum it all up, optometry has reached a point where it is in need of trained graduates who shall carry us into that professional realm towards which we have been traveling. We must now look to other than makeshifts and utilize surer and swifter tools. We have outgrown the private school, we must now endow our schools so that they may work more efficiently. We have outgrown that flimsy 2,000 hour schedule put into effect ten years ago. Then it was not flimsy, but today it is. It is entirely outmoded, and that by its own efficiency. So rapidly did we grow, fed on its sustenance, that it no longer suffices to nourish us. All along the line, educational methods and requirements have stepped ahead. Now we must take the inevitable forward step. The time is here, we dare not delay.

We may look with envy on the munificent endowments given to the schools of other professions by wealthy patrons, but we cannot expect many such until we shall have made the same relative progress, attained the same professional heights, contributed our proportion of valuable knowledge, demonstrated the usefulness to which these beneficences will be put. Until then, we must each contribute his share, be that large or small, in proportion to our abilities.

We are again at a critical time such as arose in 1921. That conference was called in order to eliminate certain vicious practices in the private schools and prepare a way for optometry's future education. Those schools are now passed away. The 2,000 hour course there arranged is now obsolete so far as meeting our present need. Another conference of practicing optometrists, representatives of state boards and representatives of the schools is imperative. New ideas and new ideals are here with which our school system must be brought into harmony.

The question as to whether or not optometry education should be within universities or outside them is hardly a matter for argument. But there is a question as to whether at the present time we would be wiser to build up a few independent schools to the strength where they can be admitted to membership in the university groups as professional graduate schools or whether we shall attempt to work out our educational problem within the university walls and with the assistance of those long trained in education. There are plenty of valid arguments on both sides.

The fear has been expressed by some that in the university the optometry courses would come under the dominance of the medical departments. There is no ground, so far as we can see, for this fear.

The past history has been that the medical department leaves the optometry department severely alone. Only in one university has there been any open hostility to the optometry courses and that arose under certain peculiar circumstances of such nature that, personally, I cannot find it in my heart to blame the dean of the medical school for his awakened hostility.

The strongest argument has been that in the university optometrists have not been allowed the right of self determination as to the subjects to be studied. But this is more the fault of the optometrists than of the universities. These institutions acceded to our requests for courses through which optometrists might become better educated. But having gained this point, we made no suggestion as to how they were to be educated nor what they were to be taught. We gave the university no picture of optometric practice. We left them to paint their own picture. Quite naturally, they took as background and foreground the optometry they saw most in evidence, stores in which all sorts of optical merchandise were displayed and sold and where the chief object of service seemed to be the sale of spectacles. We cannot then blame them for assuming that the technical part of our practice was largely concerned in practical and geometric optics nor is it their fault that the first courses in optometry given in the universities were courses in optical engineering and not in what we understand as optometric practice.

There are six universities in which optometry courses are offered. I have personally visited with the heads of the departments in five of these universities and have found them dissatisfied with the courses being given and inquiring as to what a representative group of optometrists want taught. No such information or assistance has been given them. Of course, there is a certain amount of system, must be, in a university and courses are not to be changed at the whilom notion of some instructor or professor. There is organization and regulation. But there are no unchangeable "Laws of the Medes and Persians." We have a problem to solve. Instead of taking hold and trying to help solve the problem, we have thrust it bodily into the hands of a kindly disposed group who know nothing whatever about it and have expected them to find an answer that will suit us, when they don't know from anything we have told them what the problem is.

No one knows yet just what the future optometrist ought to study. The optometrists rail against the universities for including so much theoretic optics, and without doubt the optometrists are right. But it is then their bounden duty to formally and officially so advise the university people. You and I may individually tell them our ideas, to which they will indiyidually agree. But that is not a formal declaration from an authoritative group of practitioners who have made themselves conversant with the subject. However, most of the universities have themselves learned that less theoretic optics is needed and that more

time must be given to physiology and psychology. Witness the revision of curriculum by the University of California two years ago and the newly formulated curriculum in the University of Southern California.

The few individuals who have been in a position to advise the universities in the arrangements of curricula have themselves not been so well acquainted with optometric practice as they have been conversant with the traditions of the study of physiological optics. They seem to have been inclined to the thought that our fledgling optometrist must be well grounded in his geometrical and physical optics, so the courses in some universities have been laid out to center about those branches. While the successful practitioner of modern optometry knows full well that the study of those subjects is not the requisite background, but that the foundation courses must be built on physiology.

The optometrist can leave the designing and manufacture of instruments and ophthalmic lenses to the manufacturer. The optometrist is not interested in how a beam of light passes through a lens, so long as it passes. He expects the manufacturer to surround himself with technically trained opticians who shall see that the beam of light passes with the minimum of aberration and to the proper focal point. What the optometrist needs to know is not how to make the lens but how to use the lens. To teach the boy who is planning to practice optometry how to design a microscope or a photographic lens or an ophthalmic lens is to waste his time and give him nothing whatever that will be of use to him in gaining a livelihood or serving his clients. Yet in the first of university courses to be inaugurated and in some of the independent schools, geometric optics was taken as the foundation of the course, which established an unfortunate precedent influencing other universities.

About a year ago, while talking with the head of the research department of one of the great optical manufactories, himself a well versed student of geometric and physical optics, he broke into a discussion of the teaching of optometry and expressed himself very freely as opposed to so much waste of time in the study of theoretic optics and strongly in favor of developing the study of what he termed "psychological optics." This was the attitude of the practical business man whose research laboratories had produced high quality products whose output was limited by the limited optometric knowledge of the possible users of his product. About a month ago, I was talking with a world famous student of physiological optics. He was talking of certain facts about the anatomy and functions of parts of the eye which have been known now for some twelve or fifteen years but not one of which is mentioned in the text books used in the schools, either the schools of ophthalmology or the schools of optometry. He broke into a tirade about the lack of physiological and psychological knowledge among both ophthalmologists and optometrists and expressed him-

self of the opinion that the art of refraction would never be established on a scientific basis until the courses in theoretic optics were abandoned in favor of courses in the fundamental principles of physiology and psychology. Optometry may well turn to the advice of such students as these when considering the curricula of optometric study. Of one thing we may be fairly sure. That in the training of men for success in this new profession of optometry, some of the traditions of the teaching of physiological optics must be broken. For those traditions, those methods, grew up under different conditions, when there was far less knowledge of ocular functions, of ocular anatomy and physiology than we have today. And the sum total of our ignorance now, even if we have learned a few more important facts, is appallingly great.

Optometric curricula should properly include two aims. First, the preparation of competent practitioners. Second, they should serve as substantial foundation for the few who elect to spend further time in advanced study and research. From these latter may be expected to develop a small group of teachers of optometry, something we so sadly lack today.

There is one point we might here interpolate in the discussion of this experimental period through which we must go before we learn what subjects are properly included in the optometrist's training. The independent school, when endowed and freed from the necessity of turning in a balance on the profit side, is far more free than the university in dropping, adding, altering and adapting courses. For here the faculty being small and each member in direct contact with the problem, can make any immediate change deemed advisable. But in the more complex and cumbersome university organization, such proposed changes must be given consideration by a number of authorized committees to whom are entrusted the matters of curricula. Also, the university has had the experience that a certain amount of basic and cultural study is as essential as the specific vocational studies, and the program of vocational work must compromise itself to these fundamentals. And this is in many ways an advantage. On the other hand, the purely vocational school is free from the need of occupying a certain amount of time with these basic and cultural studies, so its vocational program can be more elastic. Which in some ways is not so much of an advantage as it might at first appear.

(To be continued)

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PUPILLARY REACTION AN IMPORTANT FACTOR IN DIAGNOSIS

The reaction of the pupil serves as an important aid in diagnosis, but unfortunately many refractionists pay little or no attention to these pupillary contractions and dilations. Normally both pupils are of equal size and both respond alike when subjected to a change in intensity of illumination.

There are three ways of testing Pupillary Reactions: (1) The direct method; (2) the consensual or indirect method, and (3) the accommodative reaction. The direct light reflex we test by using increased illumination and observing the reaction of the pupil of the examined eye. The consensual or indirect light reflex, we get by exposing one eye to increased illumination and observing the contraction of the pupil of the other eye. Both the direct and indirect reactions are practically equal. In the accommodation reflex, we normally get a contraction of the pupils when the eye accommodates for an object at the near point.

In order to make use of the pupillary reaction in diagnosis, it is important that we know the afferent (in going) and efferent (out

going) routes which control the pupillary movements. The afferent impulse has its course in the retina, optic nerve, optic tracts, corpus quadrogeminum nuclei of the origin of the third nerve in the floor of the aquaduct of Sylvius. The efferent impulse travels on either side of the these nuclei to the third nerve, the ciliary ganglion, short cilliary nerves, and to the iris.

The pupil will contract under the following conditions: 1. When light reaches the retina. This is the "pupillary reflex" and is caused by the relaxation of the dilator muscle and by the contraction of the sphincter. Normally when light falls upon the retina of the eye it causes simultaneous contraction of both pupils. If only one pupil contracts, there is indication of a lesion interferring with the light reflex. 2. Persons using drugs such as opium, morphine, Pilocarpine or muscarine, will have a marked pupillary contraction. 3. Excitable conditions of the central nervous system will also cause contraction. 4. Pupils which do not react to light may indicate a condition of injury to the cervical region of the spinal cord because the dilator fibers pass through the cervical sympathetic ganglion and relay in (synaptic junction) in the superior cervical ganglion and the Gasserian ganglion, they then connect with the ophthalmic branch of the fifth nerve. The fibers then leave this nerve in the long ciliary branches. Therefore, an injury in the cervical sympathetic region will destroy the action of the dilating fibers, hence, the pupil remains contracted. 5. Agony is usually accompanied by contracted pupils. This may be due probably to the powerful flow of efferent impulses. This effects the third nerve nucleus which controls the pupil. 6. An escape of aqueous from the anterior chamber is also marked by a contracted pupil. 7. A condition of acute iritis has usually as its objective symptom a contracted pupil, grayish in color and sluggish in its action and is irregular. This may be due to adhesions between the posterior surface of the iris and the anterior capsule of the lens.

Dilation of the pupils may indicate one of these conditions: 1. In hyperactivity of the suparenal gland this dilation may be due to the presence of too much adrenaline in the blood. 2. An inactive dilated pupil may be due to a compression and severe concussion of the brain. This may be due to the fact that in this case the normal nervous impulse to the muscles is abolished. The pupils will react the same way in the event of injury to the third nerve or its nucleus. 3. Dilation of the pupil may also indicate a state of extreme exhaustion of the central nervous system when the activity of all nerve centers is low. This condition particularly is very frequently noticed by the observing refractionist. 4. The pupil may be found to dilate in emotional states such as anxiety, fear, worry, exhaustion. It is claimed that the pupil will dilate to the mere memory of such emotional state the same as it did to the actual experience. 5. When the pupil contracts to accommodation but not to light, there is an interference of the pupillary motor reflex, this disturbance may be due to the presence of certain toxins in the blood. This condition is

known as the Argyll-Robertson pupil. 6. A condition of glaucoma is indicated when the pupil is dilated, oval and immobile. In this case, this iris is usually conjested, discolored, dull and the periphery is pushed forward.

Pupil reaction in malingering.

The pupillary reaction test is a valuable objective test in malingering. If the pupil of the eye which is exposed to light contracts there is a probability of sight in that eye. 1. To test the pupillary reaction, the examiner covers both eyes with his hands—these are quickly removed and the reaction noticed. If the pupil contracts to light there is evidence of some sight and the better the reaction the more vision there is. The degree of vision, however, can not be measured by this method. There is, nevertheless, a positive value to this test, which is that if there is no contraction of the pupil to which the light is applied and there is a contracton in the pupil to which the light was not applied (i.e., consensual reaction) there is evidence then that the eye lacking pupillary reaction is blind

J. I. K.

BOOK NOTICES

REPORT OF THE TRANSACTIONS OF THE TENTH ANNUAL MEETING OF THE AMERICAN ACADEMY OF OPTOMETRY. Volume VI. Published by the American Journal of Optometry. 114 pages. Illustrated. Cloth. 1932. $5.00.

This is the report of the tenth annual meeting of the Academy held at Philadelphia last December. In the order of their appearance in the book, the following original material is presented. *Some Aspects of the Relation of the Dominant Eye to the Dominant Hand*, O. L. McCulloch, pp. 16-21: *Methods and Case Reports in Certain Phases of Ocular Physiotherapy*, L. H. Kraskin, pp. 22-27: *The Physio-Psycological Approach to Squint*, D. G. Oertel, pp. 28-41: *Facts as to Existing Conditions*, O. J. Melvin, pp. 42-52: *Pain Interpretation in Optometric Practice*, Chester H. Johnson, pp. 53-61: *The Relation Between Physiologic Exophoria and Near and Distance Abductions*, E. LeRoy Ryer and Elmer E. Hotaling, pp. 62-67: *The Relationship Between Horizontal and Vertical Phoria Measurements*, Ernest Petry, pp. 68-80: *Preliminary Report of the Research Fellow of the American Academy of Optometry on the Problem of Strabismus*, Wm. Feinbloom, pp. 81-87: *The Role of Reciprocal Innervation in Extra-Ocular Muscle Balance*, Edwin Forbes Tait, pp. 88-93 and *Ptosis Crutches and Facial Masks* by John C. Neill, pp. 94 to 107.

Copies of this limited edition may be secured only through the Secretary of the Academy, Dr. J. Fred Andreae, Lexington Building, Baltimore, Md.

C. C. K.

ANNOTATIONS
AND
SOCIETY PROCEEDINGS

The American Journal of Optometry is the Official Organ of the American Academy of Optometry, as well as the Organ of the Arkansas, Delaware, Indiana, Iowa, Maine, Maryland, Michigan, Minnesota, Nebraska, North Dakota, Oklahoma, Pennsylvania, South Dakota, Vermont and West Virginia Optometric Associations.

The following gentlemen have consented to supply items of interest from their respective sections, acting in the capacity of

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DULUTH OPTOMETRIC SOCIETY

The Duluth Optometric Society will be hosts to the Minnesota Optometric Association during a three day educational meeting to be held in that city on the 14th, 15th and 16th of August. Dr. Richard Backman, President of the Duluth Society, has arranged a splendid series of educational meetings and also a large number of other events to make this trip one of real interest and value. Dr. A. M. Skeffington will be the chief speaker. Reservations should be made in advance to the Secretary, Dr. A. R. Burquist, Alworth building. $10. A large Twin City delegation is expected to attend this meeting, which is the first of what is hoped will be an annual mid-summer educational event.

* * * * *

MISSISSIPPI VALLEY SOCIETY

According to Dr. Morton Marks, optometrist of Rockford, Ill., the June meeting of the Mississippi Valley Optometric Research Society was held at Dixon on June 7th. At this meeting the 18 point refractive outline was reviewed and plans were made for the Skeffington Clinic to be held at Sterling on the 15, 16 and 17 of June. This later clinic was subsequently held with large attendance.

UTAH OPTOMETRIC ASSOCIATION

A special meeting of the Utah Optometric Association was held at Salt Lake City Tuesday, May 31, 1932. Dr. M. H. Dearden was elected president; Dr. W. H. Landmesser, first vice president; Dr. W. H. Cubbison, second vice president; Dr. T. B. Boyle, secretary; Dr. E. E. Keller, treasurer. The Association will conduct weekly educational meetings under the Skeffington Graduate Clinic plan during the next year.

* * * * *

A. O. A. ANNUAL CONGRESS

The Annual Congress of the American Optometric Association was held at Cleveland, Ohio, June 26th to July 2nd. The speakers and their subjects at this convention were as follows: *"Light"* by Dr. W. B. Needles: *"Seeing"* by M. Luckiesh and Frank K. Moss: *"The Analysis of Data Concerning Accommodation and Convergence and their Correlation"* by Dr. Charles Sheard: *"Skiametry"* by Dr. Edwin Forbes Tait: *"Ocular Discomfort and Methods of Relief"* by Dr. Charles Sheard: *"Amblyopia and Squint"* by Dr. Julius Neumueller and *"Common Sense in Practice Building"* by Dr. W. Jerome Heather.

Dr. J. Fred Andreae, of Baltimore, President of the Association presided during the sessions of the delegates which included a trip through Nela Park, the Research Laboratories of the General Electric Co.

* * * * *

FITTING FOLKS AT HARBOR SERVICE

Dr. Charles P. Cleaves, Minister of the Gospel and optometrist of New Hampshire, in a charming letter tells a bit about his work among the kindly people of New England. The pathos and humor of "fitting folks as well as eyes" is admirably brought out by Dr. Cleaves as follows:

"A professor of biology, having distributed to his class the specimens for dissection, paused at his desk. 'It occurs to me, gentlemen,' he said, 'that there is one thing we have not with us in this examination: that is, life.' That peculiar feature, the intangible reality above all other realities, that enters the world with the body and, passing, leaves the body with no adequate explanation of its functions, contributes to all functions an element that cannot be disregarded. There is not a part of this human mechanism that, however perfect, is not affected by Consciousness, the human driver of the whole—or in what significance shall we say the divine?

"Here in the Harbor Service, which signifies an ideal rather than a vast accomplishment, we have the advantage of studying humanity from two points of view, and the binocular privilege greatly aids the perspective. Not from the ministerial nor from the optometrical point of view, but from double consciousness of human nature and human

need that two professions permit, we do what we can to help the human to understand himself and to understand others—a ministry of reconciliation. For there would be only a slight contribution to human happiness if we gave merely good vision to a race without the inner vision that makes possible the harmonious functions of this vast body, Humanity, especially in the present crisis when so many problems of industry and leisure, war or peace, crime or citizenship, are testing the balance of the mind and moral nature of society.

"Civilization, which has been credited to the survival of the fittest, has been turning to an educational and moral ideal, the survival of the *fitted*. A man is to be fitted, not simply for his competition in the world but for his part, by understanding and participation, in the common welfare. The mechanicism must have the harmonious mind, and the harmonious mind must be the understanding mind. Here in this Service we labor so much toward that end that it sometimes seems like giving life for nothing with faith that a doughnut will grow around the hole. Yet it seems to be a contribution to folks and to optometry to make clear some points that may be illustrated by anecdote.

"Some folks need to understand intelligently how much they will be able to see. There is reason why sensible, intelligent people should understand the limitations of vision, pathologic or amblyopic, and to be aided by consultations and privileges of a complete diagnosis, including all that affects vision. Yet even the hole emits a fringe of cheery light I like to share.

"Amicus Theophilos gave me a pretty job last week. Seventy-five years of age, he had the problems of the past, present and future on his mind and with the glasses supplied last autumn his vision did not rejuvenate. His optometrist was in Boston, he wanted improvement, satisfaction, compensation by exchange if it was justly due; in other words, information first. So we served as a medium, by examination. We stated the limitations of his vision, the repute of his optometrist, the fact that one lens might be changed, for exact axis, with slight improvement, and offered to correspond with his optometrist. The result winged back a letter from Boston, offering a change of lens, with request for his glasses. Amicus lives five miles hither and beyond, but we snatched the time from the calendar on the wall and took the car and the speedometer, to wind over sunny hills by devious rocky roads to a hill-top that rises from the lake and valley, explained the errand, took his glasses for mailing, and his housekeeper, having the New England sense of self-reliance and hospitality, gathered a New England dinner from the garden vegetables in return. Returning we sighted in the doorway of a small house an old man, reading, both temples of his glasses missing, the right linked to his ear by a wire cable, the left roped by a small lanyard to the other ear, the glasses perched on his nose, fifty millimeters from his corneas. Age and decrepitude were finding consolation or oblivion in the daily newspaper. His brother, also aged and lame, came in from the garden.

The offer of a pair of temples brought an appreciative smile. The conversation was genially profane—excuse me, not on the visitor's part. 'Be you an eye-glass man?' 'The minister of Harbor Service—and a registered optometrist for twenty years.' 'I thought you knew how. Well, I ain't very pious,' he said wistfully. 'But I like the church, I like ministers.' Time was short, we took his thanks and hurried away and met on the road an auto with an interested face and waved hand. Some acquaintance, we thought, but he turned and chased us to the neighboring village; a man from forty miles away, whose mother we had fitted fifteen years before, anxious to get service and get back to milk his cows. Another case of needed information; for it was not so much the failure of his optometrist but his amblyopic eye that needed cultivation of vision and an understanding of the reason why his optometrist had not given him vision equal to any man's. Good vision cannot always be bought and it is not in the power of a lens to supply it, beyond the possibilities. It is the genius of optometry to know the possibilities to the utmost."

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BACK COPIES WANTED

The Library at the Columbia University, New York City, is anxious to secure the following back copies of the American Journal of Optometry: the February and April issues of Volume 9, 1932, and the August issue of Volume 8, 1931. Any of our readers who can spare these copies should send them direct to Mr. E. B. Hepburn, Supervisor, Accessions Department, Columbia University, New York.

Also, Dr. D. G. Brown of 104 Elm Street, Pittsfield, Massachusetts, is anxious to secure a September copy of Volume 8, 1931. He is willing to pay the regular cost to anyone who can supply him with this Journal, and will greatly appreciate it if anyone who can spare this copy will communicate with him direct.

* * * * *

MINNESOTA STATE BOARD EXAMINATION

The Minnesota State Board of Optomtery will hold examinations July 27th, 28th and 29th, 1932, at the Senate Chamber of the State Capitol, St. Paul, Minnesota. Applicants should address the Secretary, Dr. E. Kiekenapp, Faribault, Minn.

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